REMARKS

This amendment is responsive to the Office Action dated March 22, 2004. Applicant has amended claim 3, 5, 6, 22, 32, 39, and 45, and added new claims 49-52 by way of this communication. Claims 1-52 are pending upon entry of this amendment.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1, 2, 6-7, 11-12, 14, 17, 18-22 and 24-48 under 35 U.S.C. 103(a) as being unpatentable over Dalmia et al.(US 6,259,109). In addition, the Examiner rejected claims 8-10, 12, 15 and 16 under 35 U.S.C. 103(a) as being unpatentable over Dalmia et al. in various combinations with Schenk (US 4,746,020), Bishop (US 6,014,209) and Zoeller et al. (US 4,752,897).

Applicants respectfully traverse the rejection to the extent such rejections may be considered applicable to the claims as amended. The applied references fail to disclose or suggest the inventions defined by Applicants' claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

Claims 1-18

For example, the applied references lack any teaching that would have suggested forming a blob list from the data stream, and analyzing blobs on the blob list to identify defects, as required by Applicants' claim 1. As described in the present application, an imaging device scans a moving web and outputs image data to a computer for analysis. The computer does not perform image processing on full images or video to detect defects, but instead builds a data structure, referred to as a "blob list," that can be used to determine defects on the continuously moving web. The present application, specifically defines a "blob" as "a connected set of pixels" within the sequentially acquired images, e.g., four connected neighboring pixels or eight connected neighboring pixels.[1] The pixels are "connected" in that they correspond to adjacent areas of the web and satisfy some connection scheme, such as a threshold binary value.

The blob list stores information that describes each "blob," such as a start and end image line, start and end pixel or other information. As each image line is received from the imaging

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[1] Present application, pg. 3.

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device, the computer identifies the start of new blobs, extensions of previously identified blobs, closing of completed blobs, and the merging of separate blobs into a single blob.

The blob list and, in particular, the data describing the connected sets of pixels, is analyzed to determine whether any defects in the web exist. As a result, the present application can detect defects within the moving web without requiring full image analysis of video data or images. To the contrary, the techniques described by the present application need only build up this data structure that describes connected sets of pixels, i.e., "blobs," and analyze the information (e.g., start position and end position) contained within data structure for each blob to determine whether any defects exist. As a result, classes of defects commonly found in continuous web manufacturing can be identified with far less computing power than was previously required. By utilizing the techniques of the present application, the raw image data may actually be discarded, and only the blob list need necessarily be stored for analysis and defect detection.

In contrast, Dalmia et al. describes a web inspection system that stores continuous video images of a web for presentation on a video display.[2] Dalmia et al. emphasizes the capability of recording the web as continuous sequences so that the web may be inspected interactively or at a later time.[3] As one example, Dalmia et al. states that the image processing system includes a computer and a mass storage device, such as a video disk, for storing the continuous sequence of images of the moving web produced by the camera.[4] In this manner, the continuous sequences images may be reviewed interactively, or may be replayed at a later time on the video display. Additionally, the continuous sequence of images of the moving web may be viewed at a slower speed than the actual speed of the moving web, thus allowing a more detailed inspection of the web.[5] Dalmia et al. emphasizes that operators and inspectors may view the live continuous video images of the web showing all of the web's characteristics, including any defects. In addition, the system can also play back the continuous video images that have been captured.[6]

Consequently, Dalmia et al. fails to teach or suggest formation of a "blob list" that describes connected sets of pixels from the data stream, and analyzing blobs on the blob list to identify defects, as required by Applicants' claim 1. In this regard, Dalmia et al. suggest the

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[2] Summary
[3] Column 1, lines 26-34
[4] Column 3, lines 10-15
[5] Column 3, lines 15-21
[6] Column 4, lines 21-25

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processing of full, continuous video data to dynamically detect defects. This technique is fundamentally different from the techniques described and claimed by the Applicants. None of the other references address these deficiencies of Dalmia et al.

In referring to Dalmia et al., the Examiner briefly states that the term "blob" is "read as the defect on the moving web." However, this assertion is incorrect and inconsistent with both: (1) the literal language of Applicants' claims, and (2) Applicants' definition of the terms "blob" and "blob list" within the specification of the present application. For example, contrary to the Examiner's assertion, and as described in detail above, the term "blob" is defined to mean a "connected set of pixels," and a "blob list" is a data structure having objects that <u>describe</u> the connected sets of pixels. Thus, a blob is not a defect, but represents a set of pixels having binary values that satisfy a connection scheme. In addition, the plain language of claim 1 requires analyzing the blob list itself to identify defects within the web. In other words, claim 1 requires analyzing the generated data structure (i.e., the "blob list") that <u>describes</u> the connected sets of pixels (i.e., the blobs) identified within the web. Dalmia et al. does not teach or suggest any such functionality for efficiently detecting web defects. To the contrary, Dalmia et al. suggests analysis of full, continuous sequences of images to detect defects in the web.

Claim 19

With respect to claim 19, Dalmia et al. fails to teach or suggest inspecting continuously moving articles on a web, comprising analyzing blobs formed from a continuous digital data stream of at least 10 mega-pixels/second imaged from at least a portion of a continuously moving article to identify defects on the articles.

Claims 20-35

With respect to claim 20, Dalmia et al. fails to teach or suggest identifying instances of the repeating pattern, forming a blob list representative of each instance of the repeating pattern from the data steam, and analyzing blobs on the blob list to identify defects. ·

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Claims 36-41

With respect to claim 36, Dalmia et al. fails to teach or suggest a computer capable of forming a blob list from the data stream and analyzing the blob list in order to identify defects in at least a portion of said continuously moving web.

Claims 42-47

With respect to claim 42, Dalmia et al. fails to teach or suggest a computer capable of forming a blob list from the data stream and analyzing the blob list in order to identify defects in at least a portion of said continuously moving flexible circuit web.

Claim 48

With respect to claim 48, Dalmia et al. fails to teach or suggest analyzing blobs formed from a continuous digital data stream of at least 10 mega-pixels/second imaged from at least a portion of a flexible circuit web to identify defects on the flexible circuit web.

With respect to Schenk, Bishop, and Zoeller et al, the noted references cited by the Examiner do not address the deficiencies discussed above with Dalmia.

For at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 1-48 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

New Claims:

Applicant has added claims 49-52 to the pending application. The applied references fail to disclose or suggest the inventions defined by Applicants' new claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed inventions. As one example, the reference fail to disclose or suggest forming a data structure from the data stream, wherein the data structure includes a set of objects, each object describing a set of pixels within the digital data stream that each have binary values that satisfy a connection threshold, and analyzing the objects of the data structure to identify defects within the web, as recited by claim 49. No new matter has been added by the new claims.
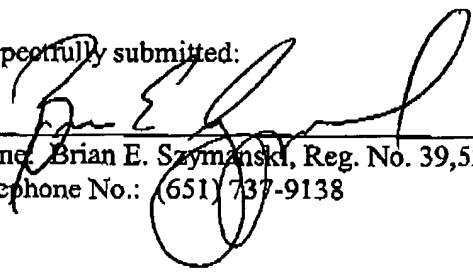
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CONCLUSION

All claims in this application are in condition for allowance. Applicants respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

June 22, 2004
Date:

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